

Depression among medical students of Faculty of Medicine, Umm Al-Qura University in Makkah, Saudi Arabia

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Abstract

Background: Medical students are future of health care but depression in them may lead to less productivity, reduced quality of life, learning difficulties, and may negatively affect patient care.

Objectives: To determine the prevalence of depression among first-, second-, and third-year medical students and factors associated with it in Umm Al-Qura University in Makkah, Makkah, Saudi Arabia.

Materials and Methods: A cross-sectional analytical study was conducted among first-, second-, and third-year male and female students at the Faculty of Medicine, Umm Al-Qura University, Makkah, Saudi Arabia. A systematic random sampling technique with proportional allocation was adopted to select students from both genders. Screening of medical students for depression was conducted using the Arabic version of Beck Depression Inventory questionnaire. Another questionnaire was used including all necessary variables that could be associated with depression among medical students.

Results: The study included 136 medical students aged between 19 and 24 years (mean age 20.9 ± 1.1 years). Slightly more than half of them (53.7%) were women. The overall prevalence of depressive symptoms among medical students was 30.9%: mild among 18.4%, moderate among 9.6%, and severe among 2.9%. The prevalence of depressive symptoms was higher among women than men (34.2% versus 27%). However, this difference was not statistically significant. Logistic regression analysis showed that medical students of the third academic level were 70% less likely to have depression compared to those of first academic level. Those who reported a history of loss of first-grade relative were at almost threefold risk of developing depression opposed to those who had no such history in the last year. Those who had moderate and high performance in examination were 70% and 84%, respectively, less likely to develop depression compared to those who had low performance. Those who had a history of depression or current depression were at almost threefold risk of developing depression than those who had no such history.

Conclusion: Depression is a significant hidden problem among medical students of Saudi Arabia. Almost one-third of medical students enrolled in the first three academic years of Umm Al-Qura University in Makkah had symptoms suggestive of depression.

KEY WORDS: Depression, medical, students, Beck's depression inventory, Saudi Arabia

Introduction

Depression is a common psychiatric disorder, affecting about 121 million people worldwide. Usually it presents with

depressed mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, low energy, poor concentration, and in severe cases suicidal ideation.^[1] It is estimated that by the year 2020, depression will be the second most common cause of disability worldwide.^[2]

Unfortunately, the exact cause of clinical depression for a particular individual is not fully known. Many theories exist about causes such as biological and genetic factors, environmental influences, and childhood or developmental events.^[3]

Academic pursuits take a heavy toll on the mental capacities of all students, and medical students are more prone to depression than their nonmedical peers.^[4] The fact that the adaptive capacities of medical students are hampered by psychiatric disorders, especially depression, is well documented

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in the literature.^[5] Persistent dysphoric mood has also been associated with medical school dropout.^[6]

Medical students are future of health care, and depression in them may lead to less productivity, reduced quality of life, learning difficulties, and may negatively affect patient care.^[7,8] Some have suggested that depression and anxiety among students may adversely affect their academic performance, contribute to academic dishonesty, and lead to smoking and substance abuse.^[9,10]

It is well known that healthy medical students are likely to become healthy physicians who can then model and promote healthy lifestyles in their patients. Depression decreases the students' capacity and disturbs their relationships with patients.^[5,6,11,12] In 2008, a study conducted in Dubai Medical College, UAE, on 165 female medical students showed that 28.6% and 28.7% had depression and anxiety, respectively.^[13] Another study carried out in Mansoura Medical School, Egypt, in 2009 on 311 medical students showed the prevalence of depression to be 28.3%.^[14]

In 2007, a local study was conducted among medical students of the College of Medicine, Qassim University, Saudi Arabia to assess the prevalence of depression and anxiety among them. The overall prevalence of anxiety and depression was found to be 66.6% and 44.4% in female and male students, respectively.^[15]

Another local study was conducted in 2012 among medical students of King Saud University, Riyadh, Saudi Arabia to estimate the prevalence of depressive symptoms among them. A high prevalence of depressive symptoms (48.2%) was found.^[16]

This study aimed to determine the prevalence of depression and factors associated with it among first-, second-, and third-year medical students of Umm Al-Qura University, Makkah, Saudi Arabia.

Materials and Methods

This cross-sectional analytical study was carried out on a representative sample of first-, second-, and third-year male and female students of the Faculty of Medicine, Umm Al-Qura University, Makkah, Saudi Arabia. Makkah is the holy city of all Muslims. It is located in the western region of KSA.

In the Faculty of Medicine, total male and female students were 440 and 510, respectively. The sample size was calculated using Epi info version 6, which was 136 male and female students at 95% confidence intervals (95% CI; expected frequency 28%, worst acceptable 35% "worst prevalence in general community worldwide").

Using systematic random sampling technique with proportional allocation, we distributed the sample size among the three academic years of medical education and determined it as a percentage proportionally related to the total students in the medical college: the total number of male students was 440 (46.3% = 63n) and the total number of female students was 510 (53.7% = 73n)—first-year male students 137

(14.4% = 20 students; 1 every 7 students selected randomly), second-year male students 170 (17.9% = 24 students; 1 every 7 students selected randomly), third-year male students 133 (14% = 19 students; 1 every 7 students selected randomly); first-year female students 154 (16.2% = 22 students; 1 every 7 students selected randomly), second-year female students 156 (16.4% = 22 students; 1 every 7 students selected randomly), third-year female students 200 (21% = 29 students; 1 every 7 students selected randomly).

Screening of medical students for depression was conducted using the Arabic version of Beck Depression Inventory (BDI) questionnaire, which is valid and used in many studies.^[17] The BDI questionnaire was found to have 99% sensitivity and 89% specificity.^[18]

Another questionnaire was used including all necessary variables (such as age, gender, nationality, marital status, economical problems, regular physical exercise, recreational activity, smoking, level of family support, and residence), which could be associated with depression among medical students.

The BDI questionnaire is a structured instrument composed of 21 categories of symptoms and attitudes, and describes behavioral manifestations of depression. It assesses the intensity of depressive symptoms. Scores range from 0 to 63, and intensity categories vary from absent or normal (0–9), mild (10–16), moderate (17–29), and severe (30–63).^[19] The cut point of diagnosing depression is a score of 10 or more.

The researcher tested the reliability of the questionnaire by retesting 10% of participants to compare the answers. An average correlation coefficient of 0.91 was obtained.

The pilot study was conducted on 14 students in medical sciences college (10%) to test the feasibility of the study. No modifications were made to the original questionnaire.

Approval of JPFCM (Joint Program of Family and Community Medicine), Makkah, and permission of the dean of Faculty of Medicine were obtained. All collected data were kept confidential. Students with depressive symptoms were advised to seek medical care in primary health-care centers.

Statistical Package for Social Sciences software, version 20.0, was used for data entry and analysis. Descriptive statistics (number, percentage for categorical variables and mean, standard deviation, and range for continuous variables) and analytic statistics using χ^2 -tests to determine the association and/or difference between two categorical variables were applied. p -Value ≥ 0.05 was considered to be statistically significant.

In multivariate logistic regression analysis model, depression based on Arabic version of the BDI questionnaire was treated as a dependent variable. Significant variables associated with depression in bivariate analysis were treated as independent categorical variables. Multiple associations were evaluated in multiple logistic regression models based on the backward stepwise selection. This procedure allowed the estimation of the strength of the association between each independent variable while considering the potential confounding effects of the other independent variables. The insignificant covariates were removed from the model. Each category of the predictor variables was contrasted with the initial category

(reference category). The adjusted measure of association between determinant factors and depression was expressed as the odds ratio (OR) with 95% CI. Adjusted ORs with 95% CI that did not include 1.0 were considered to be significant.

Results

This study included 136 medical students. Their demographic characteristics are presented in Table 1. Their age ranged between 19 and 24 years with a mean of 20.9 ± 1.1 years. Slightly more than half of them (53.7%) were women, almost equally distributed between the three academic levels (first, second, and third). The majority of students were single (94.9%). All were Saudi Arabia. Most of them (78.7%) reside at their parents' house whereas 16.2% reside at rented rooms. Two-thirds of male students (66.7%) compared to female students (89%) reside at their parents' house ($p = 0.004$).

As shown in Table 2, financial problems, practicing sports regularly, and having recreational activity were reported among 9.6%, 27.9%, and 57.4% of medical students, respectively. Loosing first-degree relative in the last year, having difficulties in English language, and presence of chronic health problems were reported among 15.4%, 30.9%, and 12.5% of medical students, respectively. Smoking was reported among one-quarter of participants, mostly the

moassil type. More than half of medical students (54.4%) reported high level of family support and 62.5% reported moderate evaluation of performance in examinations.

Family history of psychiatric illness and history of depression or current depression were reported by 16.9% and 30.1% of medical students, respectively. Financial problems were reported more among male students (15.9% versus 4.1%, with statistically significant difference between them, $p = 0.020$). Similarly, recreational activities were reported more among male students (68.3% versus 47.9%, with statistically significant difference between them, $p = 0.013$). All forms of smoking were reported more among male students ($p < 0.001$). Regarding other variables, no statistically significant difference was observed between male and female students.

As shown in Figure 1, the overall prevalence of depression among medical students was 30.9%: mild among 18.4%, moderate among 9.6%, and severe among 2.9%.

As shown in Figure 2, the prevalence of depression was higher among female students (34.2% versus 27%). However, this difference was not statistically significant. Mild and moderate depressions were reported more among female students (20.5% and 11% versus 15.9% and 7.9%, respectively), whereas severe depression was reported more among male students (3.2% versus 2.7%). However, these differences were not statistically significant.

Table 1: Demographic characteristics of medical students ($n = 136$)

Demographic characteristics	Males (n = 63) No. (%)	Females (n = 73) No. (%)	Total (n = 136) No. (%)	χ^2 (p-Value)
Age (years)				
≤20	19 (30.2)	30 (41.1)	49 (36.0)	4.57 (0.102)
21	23 (36.5)	30 (41.1)	53 (39.0)	
> 21	21 (33.3)	13 (17.8)	34 (25.0)	
Range	19–24	19–23	19–24	
Mean ± SD	21.1 ± 1.1	20.6 ± 1.0	20.9 ± 1.1	
Academic level				
First	20 (31.7)	22 (30.1)	42 (30.9)	1.54 (0.463)
Second	24 (38.1)	22 (30.1)	46 (33.8)	
Third	19 (30.2)	29 (39.8)	48 (35.3)	
Marital status				
Single	61 (96.8)	68 (93.2)	129 (94.9)	0.94 (0.286)
Married	2 (3.2)	5 (6.8)	7 (5.1)	
Nationality				
Saudi	63 (100)	73 (100)	136 (100)	NA
Non-Saudi	0 (0)	0 (0)	0 (0)	
Residence				
Parents' home	42 (66.7)	65 (89.0)	107 (78.7)	10.96 (0.004)
With a relative	4 (6.3)	3 (4.1)	7 (5.1)	
Rented Room	17 (27.0)	5 (6.9)	22 (16.2)	

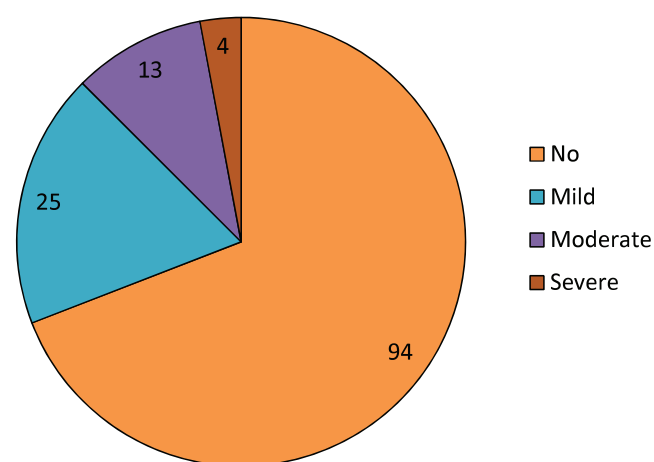
NA, not applicable.

Table 2: Personal characteristics of medical students (*n* = 136)

Personal characteristics	Males (<i>n</i> = 63) No. (%)	Females (<i>n</i> = 73) No. (%)	Total (<i>n</i> = 136) No. (%)	χ^2 (p-Value)
Financial problems	10 (15.9)	3 (4.1)	13 (9.6)	5.41 (0.020)
Practicing sports regularly	22 (34.9)	16 (21.9)	38 (27.9)	2.84 (0.068)
Recreational activity	43 (68.3)	35 (47.9)	78 (57.4)	5.70 (0.013)
Smoking				
No	38 (60.3)	64 (87.7)	102 (75.0)	15.89 (0.001)
Cigarettes	8 (12.7)	2 (2.7)	10 (7.4)	
Moassil	12 (19.0)	7 (9.6)	19 (14.0)	
Shisha	5 (8.0)	0 (0)	5 (3.7)	
Loosing of first-degree relative in the last year	13 (20.6)	8 (11.0)	21 (15.4)	2.43 (0.094)
Level of family support				
Low	9 (14.3)	9 (12.3)	18 (13.2)	0.22 (0.895)
Moderate	21 (33.3)	23 (31.5)	44 (32.4)	
High	33 (52.4)	41 (56.2)	74 (54.4)	
Evaluation of performance in examinations				
Low	14 (22.2)	8 (11.0)	22 (16.2)	3.60 (0.165)
Moderate	35 (55.6)	50 (68.5)	85 (62.5)	
High	14 (22.2)	15 (20.5)	29 (21.3)	
Difficulties in English language	22 (34.9)	20 (27.4)	42 (30.9)	0.90 (0.223)
Family history of psychiatric illness	7 (11.1)	16 (21.9)	23 (16.9)	2.81 (0.073)
History of depression or current depression	21 (33.3)	20 (27.4)	41 (30.1)	0.57 (0.286)
Chronic health problems	10 (15.9)	7 (9.6)	17 (12.5)	1.22 (0.199)

As shown in Table 3, medical students of the third academic level were 70% less likely to have depression compared to those of the first academic level (OR = 0.30, 95% CI = 0.10–0.88). Those who reported a history of loss of

first-grade relative were at almost threefold risk of developing depression than those who had no such history in the last year (OR = 3.23, 95%CI = 1.08–9.68). Those who had moderate and high performance in examination were 70% and 84%, respectively, less likely to develop depression than those who performed less in examination (OR = 0.30, 95%CI = 0.10–0.92 and OR = 0.16, 95%CI = 0.04–0.66, respectively). Those who had a history of depression or current depression were at almost threefold risk of developing depression than those who had no such history (OR = 3.53, 95%CI = 1.46–8.51). However, histories of family support and practicing sports regularly were excluded from the final logistic regression model.

**Figure 1:** Prevalence of depression among medical students, Umm Al-Qura University, Makkah, Saudi Arabia

Discussion

In this study, symptoms suggestive of depression were found in 30.9% medical students, which is low as compared to the findings of other studies conducted in Saudi Arabia and other developing countries. Medical students of King Saud University, Riyadh, Saudi Arabia, were screened for depressive symptoms using the 21-item BDI questionnaire. A high prevalence of depressive symptoms (48.2%) was found among them.^[14] In Qassim University, the overall prevalence of anxiety and depression among female medical students was found to be higher (66.6%) than among male students (44.4%).^[13]

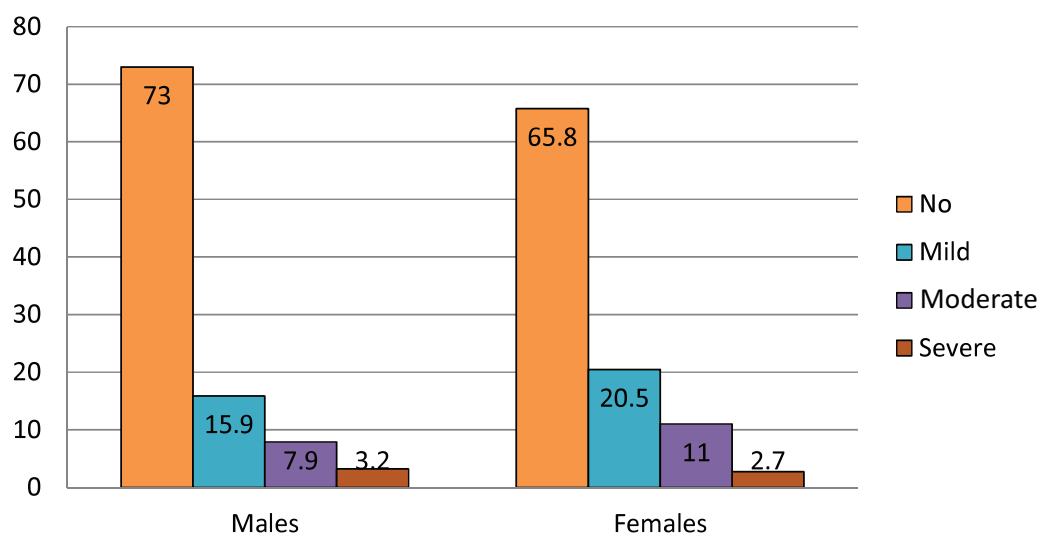


Figure 2: Prevalence of depression among medical students according to gender, Umm Al-Qura University, Makkah, Saudi Arabia

Table 3: Risk factors for depression among medical students, Umm Al-Qura University, Makkah: multivariate logistic regression analysis

Personal characteristics	Males (n = 63) No. (%)	Females (n = 73) No. (%)	Total (n = 136) No. (%)	χ^2 (p-Value)
Financial problems	10 (15.9)	3 (4.1)	13 (9.6)	5.41 (0.020)
Practicing sports regularly	22 (34.9)	16 (21.9)	38 (27.9)	2.84 (0.068)
Recreational activity	43 (68.3)	35 (47.9)	78 (57.4)	5.70 (0.013)
Smoking				
No	38 (60.3)	64 (87.7)	102 (75.0)	
Cigarettes	8 (12.7)	2 (2.7)	10 (7.4)	
Moassil	12 (19.0)	7 (9.6)	19 (14.0)	15.89
Shisha	5 (8.0)	0 (0)	5 (3.7)	(0.001)
Loosing of first-degree relative in the last year	13 (20.6)	8 (11.0)	21 (15.4)	2.43 (0.094)
Level of family support				
Low	9 (14.3)	9 (12.3)	18 (13.2)	
Moderate	21 (33.3)	23 (31.5)	44 (32.4)	0.22
High	33 (52.4)	41 (56.2)	74 (54.4)	(0.895)
Evaluation of performance in examinations				
Low	14 (22.2)	8 (11.0)	22 (16.2)	
Moderate	35 (55.6)	50 (68.5)	85 (62.5)	3.60
High	14 (22.2)	15 (20.5)	29 (21.3)	(0.165)
Difficulties in English language	22 (34.9)	20 (27.4)	42 (30.9)	0.90 (0.223)
Family history of psychiatric illness	7 (11.1)	16 (21.9)	23 (16.9)	2.81 (0.073)
History of depression or current depression	21 (33.3)	20 (27.4)	41 (30.1)	0.57 (0.286)
Chronic health problems	10 (15.9)	7 (9.6)	17 (12.5)	1.22 (0.199)

Variables excluded from the model (not significant): history of family support and practicing sports regularly.

(R), reference category; OR, odds ratio; CI, confidence interval.

* $p \leq 0.05$.

A study on medical students from Dubai Medical College, UAE, showed that 28.6% of them were depressed.^[15] A cross-sectional anonymous questionnaire-based survey was conducted among all students from first to fourth year of a medical college in India, which reported a depression prevalence rate of 49.1%.^[20] Depression was present in 35.1% students of Wah Medical College, Pakistan.^[21]

In addition, the prevalence rate of depression among medical students in this study was found to be low as compared to that of study conducted in Pakistan (60–70%).^[22,23] The prevalence of depressive symptoms among medical students in Nigeria was found to be 23%,^[24] Beirut, Lebanon 28%,^[25] and Egypt 28.3%.^[26]

Studies from Western world reported prevalence rates of depression in the range of 14–24%.^[27,28] The prevalence of depressive symptoms among Los Angeles medical students was found to be 25%^[29] and in Texas was 12%.^[30] The reason might be the difference of instrument used to assess depression and also possibly because some of these studies recruited students from private medical colleges, which could be at increased risk of developing depression.^[31] This may also be due to the different characteristics of each medical school and its students and teachers. Previous studies had probably lower rates as students tend to give dishonest responses during such surveys because of concerns on animosity and potential negative repercussions.^[32] In this study, students were assured about an animosity and encouraged them to give honest responses, which may explain differences in results.

A recent study that considered the educational environment at King Saud University Medical School had found the students' perception of the environment more negative.^[33] That study was conducted at the same institute. In other words, the low perception of the educational environment and the high rate of depressive symptoms (48.2%) were found at the same school. Is it a coincidence or a reflection of the very conventional non-student-centered program? Further research could more directly investigate the relationship between depression and curriculum elements. It would be interesting to compare different curricula with both different educational environment and prevalence of depressive symptoms. Furthermore, qualitative studies are greatly needed to provide clarification on the important negative elements in the curriculum and the educational environment.

The prevalence of depressive symptoms was high among newly entered students (first and second year) than the more senior students (third year). This finding correlates with the results of previous studies.^[6,13,14,20,22,27] This could be due to stress of new study environment and greater degree of work load with obligations to succeed, introduction of taking more responsibility for their learning and a shift from the traditional spoon-feeding teaching methodology, homesickness as most of them might live far from home for the first time, change in their sleeping and eating habits, financial indebtedness, and lack of leisure time. A decrease in symptoms of third-year medical students can be explained by a gradual adaptation to the environment and the study course.

Although not significant in this study most probably due to relatively small sample size, female students were more likely to report symptoms suggestive of depression than male students, which is consistent with the Western reports^[6] and reports from developing countries^[20] and from Saudi Arabia.^[13] A possible explanation for this finding is that women articulate depressive symptoms, even very minor ones, more easily than men, and that the excess could actually be due to this fact as much as to a true expression of greater distress.^[34]

In this study, students who performed regular exercise were less likely to have depressive symptoms. Previous research has shown that leisure activities including physical exercise reduce stress and depression in students.^[35]

There was an interesting finding in this survey that also has been reported earlier in an Indian study.^[20] We found that students facing language problem in their MBBS course were more likely to report symptoms suggestive of depression, although it was not statistically significant.

Various studies have reported substance abuse and alcoholism among medical students and junior doctors under stress.^[36,37] Such behavior cannot be ruled out in the medical community as access to drugs is relatively easier. This study did not explore substance abuse. Medical school curricula are demanding, extensive, and require high levels of competencies. Evaluation of academic performance through continuous assessment and examinations are reported to be academic stressors.^[38]

Implications of depression are a serious concern, resulting in inability to cope with curricular demands and deviant behavior, impairment of functioning in classroom performance and clinical practice.^[39]

Preparing medical students for life as doctors require more than acquisition of knowledge and skills.^[38] Constant monitoring of performance, professional conduct, and behavior associated with mental health is equally important. Although the subject is of prime importance but unfortunately literature search done by Shapiro *et al.*^[40] yielded over 600 articles discussing the importance of addressing the stress of medical education, only 24 studies reported intervention programs, and only 6 of those used rigorous scientific method. Therefore, it is important that medical educationists in Saudi Arabia conduct further studies to find the prevalence of anxiety and depression in other medical colleges, as well as, other disciplines offering graduate programs, identify the stressors and address the problem by instituting appropriate measures.

A limitation of this cross-sectional study is inability to draw cause–effect associations between the studied variables. Study was conducted in only one university in one city, thus it could not be generalizable to represent the Saudi community of medical students. Also, no data on psychological status of students before entering medical school were available.

Conclusion

In conclusion, depression is a significant hidden problem among medical students of Saudi Arabia. Almost one-third

medical students enrolled in the first three academic years of Umm Al-Qura University, Makkah, Saudi Arabia, had symptoms suggestive of depression. The prevalence of depressive symptoms was high among first- and second-year students as compared to the third-year students. Students who reported a history of loss of first-grade relative, had low performance in examination, and had a history of depression or current depression were at higher risk of developing depression.

References

- World Health Organization. Definition of Depression, 2009. Available from http://www.who.int/mental_health/management/depression/definition/en.2009.
- Lopez AD, Murray CC. The global burden of disease. *Nat Med* 1998;4(11):1241–3.
- All About Depression. Available at: www.allaboutdepression.com (last updated on July 2, 2010).
- Rosenthal JM, Okie S. White coat, mood indigo—depression in medical school. *N Engl J Med* 2005;353(11):1085–8.
- Reuben DB. Depressive symptoms in medical house officers. Effects of level of training and work rotation. *Arch Intern Med* 1985;145:286–288.
- Clark DC, Zeldow PB. Vicissitudes of depressed mood during four years of medical school. *JAMA* 1988;260(17):2521–8.
- Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among US and Canadian medical students. *Acad Med* 2006;81:354–373.
- Rosvold EO, Bjertness E. Physicians who do not take sick leave: hazardous heroes? *Scand J Public Health* 2001;29:71–5.
- Xiang H, Wang Z, Stallones L, Yu S, Gimbel HW, Yang P. Cigarette smoking among medical college students in Wuban, People's Republic of China. *Prev Med* 1999;29:210–5.
- Webb E, Ashton C, Kelly P, Kamali F. Patterns of alcohol consumption, smoking and illicit drug use in British university students: interfaculty comparisons. *Drug Alcohol Depend* 1977;47:145–53.
- Dahlin ME, Runeson B. Burnout and psychiatric morbidity among medical students entering clinical training: a three year prospective questionnaire and interview-based study. *BMC Med Educ* 2007;12:76.
- Ahmadi J. Rate of depression among medical students, resident physicians and physiotherapy students at Shiraz University of Medical Sciences. *J Shiraz Univ J Soc Sci Human* 1994;10:101–11.
- Ahmed I, Banu H, Al-Fageer R, Al-Suwaidi R. Cognitive emotions: depression and anxiety in medical students and staff. *J Crit Care* 2009;24(3):e1–7.
- Amir M, El Gillany A. Self-reported depression and anxiety by students at an Egyptian Medical School. *J Pak Psychiatr Soc* 2010;7(2):71.
- Inam SB. Anxiety and depression among students of a medical college in Saudi Arabia. *Int J Health Sci (Qassim)* 2007;1(2):295–300.
- Al-Faris EA, Irfan F, Van der Vleuten CP, Naeem N, Alsalem A, Alamiri N, et al. The prevalence and correlates of depressive symptoms from an Arabian setting: a wake up call. *Med Teach* 2012;34(Suppl 1):S32–6.
- Abdel-Khalek A. Internal consistency of an Arabic adaptation of the Beck Depression Inventory in four Arab countries. *Psychol Rep* 1998;82(1):264–6.
- Sharp LK, Lipsky MS. Screening for depression across the lifespan: a review of measures for use in primary care settings. *Am Fam Physician* 2002;66:1001–8.
- Lightfoot SL, Oliver JM. The Beck Inventory: psychometric properties in university students. *J Pers Assess* 1985;49(4):434–6.
- Singh A, Lal A, Shekhar. Prevalence of depression among medical students of a private medical college in India. *Online J Health Allied Sci* 2010;9(4):8.
- Alvi T, Assad F, Ramzan M, Khan FA. Depression, anxiety and their associated factors among medical students. *J Coll Phys Surg Pak* 2010;20(2):122–6.
- Khan MS, Mahmood S, Badshah A, Ali SU, Jamal Y. Prevalence of depression, anxiety and their associated factors among medical students in Karachi, Pakistan. *J Pak Med Assoc* 2006;56:583–6.
- Inam SNB, Saqib A, Alam E. Prevalence of anxiety and depression among medical students of private university. *J Pak Med Assoc* 2003;53:44–7.
- Aniebue PN, Onyema GO. Prevalence of depressive symptoms among Nigerian medical undergraduates. *Trop Doct* 2008;38:157–8.
- Mehanna Z, Richa S. Prevalence of anxiety and depressive disorders in medical students, transversal study in medical students in the Saint Joseph University of Beirut. *Encephale* 2006;32:976–82.
- Ahmadi J, Kamel M, Ahmed MG, Bayoumi FA, Abdul Moneenum A. Dubai Medical College students' scores on the Beck Depression Inventory. *Iranian Red Crescent Med J* 2008;10(3):169–72.
- Goebert D, Thompson D, Takeshita J, Beach C, Bryson P, Ephgrave K, et al. Depressive symptoms in medical students and residents: a multischool study. *Acad Med* 2009;84:236–41.
- Clark DC, Zeldow PB. Vicissitudes of depressed mood during four years of medical school. *JAMA* 1988;260:2521–8.
- Rosenthal JM, Okie IS. White coat, mood indigo—depression in medical school. *N Engl J Med* 2005;353:1085–8.
- Levine RE, Litwins SD, Frye AW. An evaluation of depressed mood in two classes of medical students. *Acad Psychiatry* 2006;30:235–7.
- Yousafzai WA, Ahmer S, Syed E, Bhutto N, Iqbal S, Siddiqi MN, et al. Well-being of medical students and their awareness on substance misuse: a cross-sectional survey in Pakistan. *Ann Gen Psychiatry* 2009;8:8.
- Levine RE, Breitkopf CR, Sierles FS, Camp G. Complications associated with surveying medical student depression: the importance of anonymity. *Acad Psychiatry* 2003;27:12–18.
- Al-Ayed IH, Sheikh SA. Assessment of the educational environment at the College of Medicine of King Saud University, Riyadh. *East Mediterr Health J* 2008;14(4):953–9.
- Noble RE. Depression in women. *Metabolism* 2005;54:49–52.
- Saikh BT, Kahloon A, Kazmi M, Khalid H, Nawaz K, Khan N, et al. Students, stress and coping strategies: a case of Pakistani medical school. *Educ Health (Abingdon)* 2004;17:346–53.

36. Akvardar Y, Demiral, Ergor G, Bilici M, Akil Ozer O. Substance abuse in a sample of Turkish medical students. *Drug Alcohol Depend* 2003;72(2):117–21.
37. Kumar P, Basu D. Substance abuse by medical students and doctors. *J Indian Med Assoc* 2000;98(8):447–52.
38. Calkins EV, Arnold L, Willough TL. Medical students' perception of stress, gender and ethnic consideration. *Acad Med* 1994;69 (Supp 1):S22–4.
39. Bramness JA, Fixdal TC, Valgum P. Effect of medical school stress on mental health of medical students in early and late clinical curriculum. *ACTA Psychiatr Scand* 1991;84:340–5.
40. Shapiro SL, Shapiro DE, Schwartz GE. Stress management in medical education: a review of literature. *Acad Med* 2000; 75(7):748–59.

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